

## **REMARKS**

Claims 1-31 and 33-42 are pending in the application. Claims 1-19, 24, 26-31 and 39-42 have been previously withdrawn from consideration. Claims 20-23, 25 and 33-38 stand rejected to by the Examiner. The drawings have been accepted by the Office. The Examiner's objections and rejections are addressed below in substantially the same order as in the office action.

### **CLAIM OBJECTIONS**

The Examiner objected to claim 22 as not in compliance with Rule 1.75(c). Claim 22 has been cancelled.

### **CLAIM REJECTIONS UNDER 35 U.S.C. 112**

Claim 20 stands rejected because the Examiner contends that the specification does not enable a one skilled in the art to practice the claimed invention. Applicant submits that claim 20 is fully supported by the specification. It is the Applicant's position that one of ordinary skill in the art would simply leave the metal cap off the liner to make an embodiment commensurate with the claims. Such arrangements are ubiquitous in the art.

Claims 20-23, 25 and 33-38 stand rejected because the Examiner contends the following:

With respect to claims 21 and 22, that use of the term "filler material" is unclear. It is the Applicant's position that the claims follow conventional terminology and define the nature of the claimed invention.

With respect to claims 20-23, 25 and 34-38, that the claims are missing an essential element of a metal cap. It is the Applicant's position that one skilled in the art would understand that the metal cap is not an essential element.

With respect to claim 33, the explosively formed penetrator term has been removed.

### **CLAIM REJECTIONS UNDER 35 U.S.C. 102**

With respect to claims 20-23, 25 and 3-38, the Examiner contends that Liu teaches all elements of these claims. To Applicant's reading, Liu has no teaches of particulated portion in either the liner or the jet formed by the liner. Thus, Applicant submits that these claims are allowable over Liu.

### **CLAIM REJECTIONS UNDER 35 U.S.C. 103**

Claims 20-23, 25 and 33-38 stand rejected under 35 U.S.C. as being unpatentable over Powell (US 6786157) in view of Liu (US 2003/0037692 A1). The Examiner contends that the motivation to include a metal cap layer disposed upon Powell's liner so as to provide Powell's particulated jet with a more dense leading metal portion with enhanced penetrative/cutting properties is properly found in Liu. The Examiner further contends that the proposed modification would be used for downhole applications, not avalanche control.

It appears that the Examiner and the Applicant disagree on whether it is obvious to modify shaped charge design to form perforations in a casing or liner with pipe cutting technology intended to sever a pipe. Applicant herewith submits a Rule 131 Affidavit that such a combination would not be obvious given the distinct operations of shaped charges and pipe cutters. To maintain a complete record, Applicant has reproduced the previous argument made by the Applicant and has

Applicant respectfully submits that the Examiner has used the Applicant's application as a blueprint to combine the contrary teachings of Powell and Liu. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in

the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP 2143.

In this instance, the prior art clearly does not have a suggestion or motivation to combine. Section 2143.01 of the MPEP defines two cases that preclude a finding of a suggestion to combine: (i) a modification that would change the principle of operation, and (ii) a modification that renders a device unsatisfactory for its intended purpose. For the reasons presented below, the Examiner's proposed modification falls within these two cases.

1. ***MPEP 2143.01 VI. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)***

The principles of operation of the Powell Device and the Liu Device are distinct and incompatible. Modifying the Powell Device with the metal cap of the Liu Device would clearly change the principle of operation of the Powell Device. The key operational principle of the Powell Device is the dispersion of energy using particulate material:

Accordingly, the present invention provides a hollow charge explosive device including an explosive charge defining boundary walls of a cavity and including **particulate material** located forward of said boundary walls **so as to be dispersible by said explosive charge when detonated**. (Col. 2, lines 34-38)

The particulate material, if present in a liner, is driven in the same way as that of a conventional shaped charge liner. **However, in this case, the particulate medium forms into a highly energetic non-cohesive stream of particles, generally wider than that produced by a conventionally lined shaped charge.** In this highly energised state, the low bulk density of the liner material and high surface area attributable to each particle of the liner material, together with the larger surface area of the jets cross section, facilitates an intimate and violent kinetically stimulated reaction with the target medium. Given a knowledge of the intended target material and its constitution, eg a snow slab, the liner material can be

chosen to optimise the blast energy yield over and above that normally attributable to the explosive charge alone. (Col. 2, lines 42-55)(emphasis added)

Furthermore, Powell describes the advantages of his invention with respect to the volume of snow removed, not the depth of the crater created by the charge. In particular, Powell explains that significantly greater volume of the craters in Figures 4 and 5 as compared with Figure 3. Powell does not in any way suggest that the depth of penetration would improve the operation of the device. In fact, Figures 6-9 suggest quite the contrary. Powell shows all four embodiments either above or at the surface of the snow. The principle behind the Powell device is based on a wide-dispersion near surface detonation, which is contrary to the deep penetration features of Liu.

The Examiner correctly points out that Powell does suggest a downhole hole application for its device. However, as Applicant discussed in the prior filing, the downhole application was for “cutting” wellbore tubulars (“rapid internal cutting of narrow bore, thick walled pipes, typical of well liners and drilling shafts”). Given the ample context Powell gives, it is clearly that Powell intends the wide dispersive energy blast to cut the pipe. This is often done to remove pipe from a wellbore and the wide energy blast would be advantageous to sever the pipe. However, the principle of operation of Liu is to generate a concentrated jet driven by sufficient energy to deeply penetrate a formation surrounding a pipe, while forming a small perforation that otherwise leaves the pipe intact. The diametrically opposite principles of operation of these references preclude a finding of prima facie obviousness because the Examiner’s proposed modification or combination of Powell and Liu would necessarily change the principle of operation of Powell, even in downhole applications.

In connection with this issue, Applicant has submitted the affidavit of one skilled in the art is support of the Applicant’s contention that the pipe cutting aspects of Powell have no meaningful relationship with the operation and use of shaped charges.

2. ***MPEP 2143.01 (v) If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)***

The Examiner contends that “enhanced penetrative properties” would motivate one skilled in the art to combine a metal cap layer with the Powell liner for downhole applications. Providing the Powell liner with “enhanced penetrative properties,” however, would make the Powell device unsatisfactory for its stated applications for “cutting of narrow bore, thick walled pipes.” The Examiner has yet to explain how enhancing penetration benefits the cutting of pipes. Enhanced penetration would, as Powell repeatedly explains in various instances, direct the focus of the energy stream away from the area of interest. In this case, the enhanced penetration would direct the energy blast into a formation surrounding the wellbore pipe. In contrast, a wide dispersion shallow blast would impact the perimeter of the pipe to be cut. Thus, cutting pipe requires a severing of a circumference of the pipe, not merely perforating a section of the pipe. Accordingly, one skilled in the art would not combine the metal cap with the Powell liner because the Powell device would be rendered unsatisfactory for its intended purpose of cutting pipe.

#### **Other Discussion in Powell that Teaches Away from the Combination**

Applicant further observes that the applications Powell suggests for the present teaching do not utilize enhanced penetration:

Although the use of present invention has been described in terms of avalanche control applications, the benefits of controlled and highly directional cutting, perforation or stimulation of secondary reactions of explosive devices according to the present invention has a wide range of other potential applications. These include:

rapid generation of wide access holes in concrete/rock walls in support of rescue and recovery operations, where a range of liner materials and

particle sizes for the liner can be chosen to control the nature of the cut and/or residual particle penetration into sensitive areas behind;

the use of directing the **highly focused blast effects** to combat and extinguishing burning oil wells;

rapid internal **cutting of narrow bore, thick walled pipes**, typical of well liners and drilling shafts; and

**spalling of loose rock from chamber roofs** in underground mines, civil tunnelling and mining operations and underwater engineering operations. (Col. 8, Lines 13-30)(emphasis added).

“Enhanced penetration” plays no role, to Applicant’s knowledge, in any of the above applications. Rather, each of the above applications involve surface or near surface activity. Applicant further observes that Powell specifically states that his device is for “**cutting**” well liners and drilling shafts—not perforating well liners. Indeed, as one skilled in the art would appreciate, a perforating activities that cuts a well liner is highly undesirable since the overall wellbore structure can be weakened and compromised. In connection with this issue, Applicant has submitted the affidavit of one skilled in the art is support of the Applicant’s contention that the maintaining integrity of a pipe is a design consideration for shaped charges and the lack of integrity may lead to collapse of a wellbore.

## **CONCLUSION**

For all the foregoing reasons, Applicant submits that the application is in a condition for allowance and such action is requested. The Commissioner is authorized to charge any fees deemed necessary or credit any overpayment related to the filing of this Response to Deposit Account No. **13-0010 (COR-1075-US)**.

Respectfully submitted,

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